

WHAT IS CLAIMED IS:

- 5 1. Virus-like particles comprised of recombinant L1 protein or recombinant L1 + L2 proteins of human papillomavirus 18, the virus-like particles being at least 60% pure.
- 10 2. The virus-like particles of Claim 1 wherein the recombinant L1 protein or the recombinant L1 + L2 proteins is produced in yeast.
- 15 3. A method of producing the virus-like particles of Claim 1, comprising:
  - 16 (a) transforming yeast with a recombinant DNA molecule encoding papillomavirus L1 protein or papillomavirus L2 protein or papillomavirus L1 + L2 proteins;
  - 20 (b) cultivating the transformed yeast under conditions that permit expression of the recombinant DNA molecule to produce the recombinant papillomavirus protein; and
  - 21 (c) isolating the recombinant papillomavirus protein to produce to virus-like particles of Claim 1.
- 25 4. Recombinant papillomavirus protein produced by the method of Claim 3.
- 30 5. A vaccine comprising the virus-like particles of Claim 1.
6. Pharmaceutical compositions comprising the virus-like particles of Claim 1.
7. A method of preventing papillomavirus infection comprising administering the vaccine of Claim 5 to a host.

8. A method for producing a yeast-derived recombinant papillomavirus capsid protein assembled into a virus-like particle, comprising:

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- a) cloning a papillomavirus gene that codes for at least one papillomavirus capsid protein into a vector;
  - b) transferring the vector into a host cell to produce a recombinant host cell;
  - c) cultivating the recombinant host cell under conditions that permit production of papillomavirus capsid protein; and
  - d) purifying the papillomavirus capsid protein under conditions that permit formation of a virus-like particle.
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9. Virus-like particles produced by the method of Claim 8.

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10. A method for inducing an immune response in an animal comprising administering the virus-like particles of Claim 1 to an animal.

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11. The virus-like particles of Claim 2 wherein the yeast is selected from *Saccharomyces cerevisiae*, *Hansenula polymorpha*, *Pichia pastoris*, *Kluyvermyces fragilis*, and *Schizosaccharomyces pombe*.

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12. The virus-like particles of Claim 1 wherein the L1 protein is encoded by the DNA sequence of Figure 1.

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a2

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c1 7